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fourth and the seventh are excluded, to which the name *pentatonic* has been given. The ancient Peruvians had music very difficult to learn, which expressed, with great compass and pathos, the agreeable and disagreeable emotions of their daily lives. Mr. Barber repeats an account, given by Don Fred. Blume, of the wails of a Peruvian woman on hearing the news of the death of a brother. "The announcement came, it seems, unexpectedly, and the explosion was that of a volcano of grief, — terrible jets from time to time; then a quiet interval; and then, again, a great outburst; and so on. . . . Thus I came to understand how their 'operas' originated, and how natural a mode of expression they are." — (*Amer. nat.*, March.) J. W. P. [751]

Aztec music. — While arranging the Poinsett and Keating collections of antiquities in the museum of the academy, Mr. H. S. Cresson noticed some Aztec flageolets and whistles, or pitch-pipes of terra-cotta, an investigation of which had yielded some facts which might be of importance to the ethnologist. Most authorities upon the subject have arrived at the conclusion that the musical knowledge of barbarian tribes is confined to the limits of the so-called pentatonic scale, in which the fourth and seventh tones of the scale, as known to us, are wanting. Upon trying the four-holed Aztec flageolets in question, he had found, that, by closing the bell with the little finger, they could be lowered a full tone, and, from the tonic note thus obtained, the octave could be produced, including the fourth and seventh notes as known to us. Five of the flageolets in question were exhibited, — two in the key of C natural, one in the key of B natural, and the other two in F sharp and B flat respectively. The last-named instrument was chosen to produce the fourth and seventh tones, upon which an expert performer on the Boehm flute ran the diatonic and chromatic scales with but little difficulty. The pitch-pipes, or whistles, were next exhibited; and the same performer demonstrated that a full octave could be produced thereon, together

with the ninth, eleventh, and twelfth notes, the tenth being missing. The whistle producing this tenth note must have existed, as it is preposterous to suppose that a people capable of manufacturing the instruments in our possession (several of which are duplicated in the collection), which may be played in trio or quartette, were not more thoroughly acquainted with the principles of music than to content themselves with the narrow limits of the pentatonic scale. This is proven by their ability to manufacture instruments capable of producing, not only the fourth and seventh tones of the diatonic scale, but also the entire chromatic scale. — (*Acad. nat. sc. Philad.*; meeting April 3.) [752]

EARLY INSTITUTIONS.

New-England towns. — The student of early institutions in America will be interested in the recent 'History of Great Barrington' (Berk County, Mass.), by Charles J. Taylor. The upper township was distributed in forty proprietary rights. James Bowdoin had seven and a half; other persons had six, five, four, two and a half, or one apiece. These rights were fixed by the settling committee at four hundred acres each. Allotments were made accordingly. We are struck by the resemblance between these proprietary rights with equivalents, and the *mansu, cum campis, pratis, pascuis silvis*, in the German colonies of the early and middle ages. The free colonies, like most of our New-England towns, were associations of proprietors, with defined rights in the land; in recognition of which, each man received certain home-lots and arable lots, together with meadow, pasture, and forest lands; the latter being, very often, held in common. Mr. Taylor confines himself strictly to the history of his own town; but this history embraces many interesting facts, and is suggestive in many ways. The words of Burke, 'People will not look forward to posterity who never look backward to their ancestors,' are printed upon the titlepage. — D. W. R. [753]

INTELLIGENCE FROM AMERICAN SCIENTIFIC STATIONS.

PUBLIC AND PRIVATE INSTITUTIONS.

Peabody museum of American archaeology, Cambridge, Mass.

Altar-mounds in Anderson township, Ohio. — Several of the mounds explored the past summer by Dr. Metz and the curator contained 'altars,' or basins, of burnt clay, on two of which there were literally thousands of objects of interest. Two of these altars, each about four feet square, were cut out, and brought to the museum. Among the objects from the altars are numerous ornaments and carvings unlike any thing heretofore found.

One altar contained about two bushels of ornaments made of stone, copper, mica, shells, the canine teeth of bears and other animals, and thousands of pearls. Nearly all of these objects are perforated in various ways for suspension. Several of the copper ornaments are covered with native silver, which had been hammered out into thin sheets, and folded over the copper. Among these are several of the spool-shaped objects (which I now regard as ear-ornaments), a bracelet, and a bead. One small copper pendant seems to have been covered with a thin sheet of gold. This is the first time that native gold has been found in the mounds, and the small amount found here shows that its use was exceptional. The

ornaments cut out of mica are very interesting, and embrace many forms. Among them are a grotesque human profile, and the heads of animals, whose features are emphasized by a red color. Many of the copper ornaments are large and of peculiar shape. There are about thirty of the singular spool-shaped earrings made of copper. Three large sheets of mica were also found; and several finely chipped points of obsidian, chalcedony, and chert, were in the mass of materials. Several pendants, cut from a micaceous schist, are of a unique style of work. Three masses of native copper were found on the altar.

But by far the most important things found on this altar were the several masses of meteoric iron and the ornaments made from this metal. One of these is half of a spool-shaped object, or ear-ornament, like those made of copper, with which it was associated. Another of these ear-ornaments is covered with a thin plating of the iron, in the same manner as others were covered with silver. There is also a folded and corrugated band of iron of the same shape, and nearly the same size, as the band of copper found in a mound in Tennessee, and figured in the last report of the museum (fig. 16). Three of the masses of iron have been more or less hammered into bars, as if for the purpose of making some ornament or implement, and

another is apparently in the natural shape in which it was found.

It is worth recapitulating here, that *native* gold, silver, copper, and iron, were all found on the altar of the large mound in this group, and that all were manufactured into ornaments simply by hammering.

On the altar of another mound of the group were several terra-cotta figurines of a character heretofore unknown from the mounds. Unfortunately, these objects, as well as others found on the altars, had been more or less burnt; and many of them appear to have been purposely broken before they were placed on the altars. Many pieces of these images have been united; and enough has already been made out to show their importance in the study of early American art. The peculiar head-dresses, method of wearing the hair, and the large button-like ear-ornaments, shown on these human figures, are of particular interest. The shape of the ear-ornaments leaves no doubt of the character of the spool-shaped objects previously referred to. On the same altar were two remarkable dishes in the form of animals, carved from stone, which have been nearly restored from a large number of small fragments. With these were a serpent cut out of mica, several hundred small quartz pebbles from the river, and nearly three hundred astragali of deer and elk. As but two of these bones could be obtained from a single animal, and as there were but one or two fragments of other bones, there must have been some special and important reason for collecting so large a number of these particular bones. A finely made bracelet of copper, and several other ornaments of copper, a few pearls and shells and other ornaments, were on this altar, with two large masses of native copper, and a mass of unworked meteoric iron. Many fossil shells were found on both altars.

Harvard college observatory, Cambridge, Mass.

Astronomical photographs.—It is proposed to form, at the observatory, a collection of photographs of the heavenly bodies and of their spectra. Original negatives would be particularly valuable. It may happen that some such negatives, having slight imperfections which would limit their value for purposes of engraving, could be spared for a collection, and would be as important, considered as astronomical observations, as others photographically more perfect. In some cases, astronomers may be willing to deposit negatives taken for a special purpose, and no longer required for study, in a collection where they would retain a permanent value as parts of an historical series. Where photography is regularly employed in a continuous series of observations, it is obvious that specimen negatives only can be spared for a collection; but in such cases it is hoped that some duplicates may be available, and that occasional negatives may hereafter be taken for the purpose of being added to the collection, to exhibit recent improvements or striking phenomena. When negatives cannot be furnished, glass positives, taken, if possible, by direct printing, would be very useful. If these, also, are not procurable, photographic prints or engravings would be desirable.

The observatory already possesses many of the early and historically important specimens which would naturally form part of such a series. Among these may be mentioned four series of daguerrotypes and photographs of various celestial objects, taken at this observatory. These series were respectively undertaken in 1850, 1857, 1869, and 1882.

Copies of memoirs or communications relating to the specimens sent, or to the general subject of astronomical photography, would form an interesting

supplement to the collection. A part of the contemplated scheme will involve the preparation of a complete bibliography of the subject, including a list of unpublished photographs not hitherto mentioned in works to which reference may be made.

The expense which may be incurred by contributors to the collection in the preparation and transmission of specimens will be gladly repaid by the observatory, when desired.

NOTES AND NEWS.

—The titles of the papers read during the recent session of the National academy of sciences at Washington, April 17 to 20, were: Joseph LeConte, On the genesis of metalliferous veins (read by T. Sterry Hunt); Elias Loomis, On barometric gradients (read by Cleveland Abbe); Ira Remsen, On the nascent state of oxygen; E. D. Cope, On the structure of the skull in the Hadrosauridae; G. W. Hill, Determination of the inequalities of the moon's motion which are produced by the figure of the earth (a supplement to Delaunay's 'Theorie du mouvement de la lune'); T. Sterry Hunt, The decay of rocks geologically considered; S. Weir Mitchell and E. T. Reichert, On the composition of the venom of serpents; Ira Remsen, On changes in the properties of atoms and atomic groups caused by changes in the position in a molecule; W. Ferrel, Maxima and minima tide-predicting machine; S. P. Langley, On the measurement of wave-lengths of heat; Otto von Struve, On the great object-glass made by Alvan Clark and Sons for the Pulkova observatory; S. P. Langley, On the spectrum of an argand gas-burner; G. F. Barker, Efficiency of storage-batteries; C. H. F. Peters, Photographs of the great comet of 1882; H. A. Rowland, Progress in spectrum photography; A. W. Wright, Some experiments upon a method of forming a visible image of the solar corona; A. W. Wright, On the phosphorescence of sulphate of quinine; Wolcott Gibbs, Further generalizations regarding complex inorganic acids; A. Agassiz, The fauna of the Gulf of Mexico.

The autumn session of the academy, for the reading of scientific papers, will be held at New Haven in November.

—Special reports Nos. 56 and 57 of the U. S. department of agriculture for February and March, 1883, are entirely occupied with statistics. No. 56 opens with a report upon the numbers and values of farm-animals in the several states and territories, including a comparison with the corresponding statistics of last year. These show that there has been a decided increase in the number, and in the average price per head, of these animals. The statistics of the cotton-crop point to a probable total movement of not less than 7,000,000 bales, of unusually good quality; making the total crop nearly four per cent larger than the great crop of 1880. The report contains, also, a comparison of the prices of English and American agricultural implements, an article on